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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/671,887	09/29/2003	Fred Gehrung Gustavson	YOR920030010US1	7986

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EXAMINER

NGO, CHUONG D

ART UNIT	PAPER NUMBER
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2193

MAIL DATE	DELIVERY MODE
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10/31/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/671,887

Applicant(s)

GUSTAVSON ET AL.

Examiner

Chuong D. Ngo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 August 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2 and 4-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- 1) ☐ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4 pages.
- 4) ☒ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claims 1,2 and 4-27 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 1-9 and 19-27 are directed to a computer implemented method that merely involve manipulations and calculations of data values, claims 10-14 are although directed to an apparatus, broadly encompass a general computer implementing the method, and claims 15-18 are directed to a computer program for implementing the method. In order for a claimed invention that is directed to such a computer implemented method that merely involve manipulations and calculations of data values, or a computer or a computer readable medium having a computer program implementing the method to be statutory, the claimed invention must accomplish a practical application. That is the claimed invention must transform an article or physical object to a different state or thing, or produce a useful, concrete and tangible result. State Street, 149 F.3d at 1373-74, 47 USPQ2d at 1601-02. Also see "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility", OG Notices: 22 November 2005. It is clear from claims 1,2 and 4-27 that the claims merely involves calculations and manipulations of data such as storing data in a memory in a particular manner, for example, in claim 1, and executing at least one matrix subroutine, for example, in claim 2. Neither the data stored in the caches nor the result of the executing matrix subroutine has a real

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world value. The claimed invention does not transform an article or physical object to a different state or thing. The inputs are numbers and the results are also numbers. Further, the result of the invention is merely numerical values without a practical application recited in the claims. It is not real world result, and thus is not useful, concrete and tangible. Therefore, the claimed invention is directed to non-statutory subject matter as the claims fail to accomplish a practical application.

3. Claims 1,2,5-10,12-16,18,19,21-23 and 25-27 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As per claim 1, the limitation of the recitation "storing data contiguously ... in an increment block size", lines 3-4, is unclear, since data of a matrix contiguously stored in a memory can be viewed as being stored in any increment block size. Claims 10,15,19 also have the same problem.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1,2,5-10,12-16,18,19,21-23 and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Myszewski (5,099,447) in view of Lao et al. (2003/0088600).

As per claims 1,2,5,6,7,9,10,12,14,15,18 and 25-27, Myszewshi discloses an execution of a matrix subroutine including DGEMM (see col. 1, line 35) in which the matrix is divided into blocks for storing, retrieving and operating on, wherein block size is based on the cache size and clearly including rectangular blocks such that the width of the blocks in a first term matrix is the same as the height of the corresponding blocks in the second term matrix (see col. 4, line 55-64). It noted that Myszewshi does not specifically disclose that the block fits into a wording space of the cache. However, Lao et al. discloses on page 4, paragraph [0071] that the guide for optimally partitioning a matrix is to use large contiguous blocks but make them small enough to fit in the cache. Thus, it would have been obvious to a person of ordinary skill in the art to have the block size that fits into the cache as taught by Lao et al in order to take maximum advantage of the cache and to keep cache misses at a minimum. Further, the combined teaching of references is clearly applicable for system having one dimensional L1 or L2 caches which has a first dimension being one, and thus is smaller than a corresponding first dimension of the block, and a second dimension clearly greater than the corresponding second dimension of the block in order for the block to fit into the cache.

As per claims 8,13,16,19,21 and 22, although the combined of references does not specifically disclose, it would have been obvious applications to employ the teaching combined of references in executing subroutine from a Lapack, and in a problem solving as claimed to improve the speed of execution.

As per claim 23, as the block fits into the cache, the block size is clearly smaller or equal to the cache size.

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6. Applicant's arguments filed 08/21/2007 have been fully considered but they are not persuasive.

Regarding the rejection under 35 USC 101, it is respectfully submitted that the claimed invention merely perform manipulations and calculation of data. The executing a matrix subroutine itself is non-statutory regardless how it is implemented since it does not provide a practical result. An invention that merely storing data in a particular manner to improve a non-statutory subject matter such as the execution of a matrix subroutine as claimed is thus also non statutory since it also does not produce a useful result.

Regarding the rejection under 35 USC 112, the limitation of the recitation "storing data contiguously ... in an increment block size" is unclear because a data of a matrix contiguously stored in a memory can be viewed as being stored in any increment block size of any dimension. For example, a data of a 4x4 matrix contiguously stored in a memory can be viewed as being stored contiguously in 16 blocks of size 1, 8 blocks of size 2, 4 blocks of size 4, 2 blocks of size 8 or 1 blocks 16, and a block size of 8, for example, can be viewed as to have a dimensions of 1x8, 2x4, 4x2 or 8x1. Therefore, the recitation appears not to have a limitation.

Regarding the rejection under 35 USC 103, it is submitted that the combined references of Myszewshi and Lao et al as set forth above clearly suggest an execution of a matrix subroutine including DGEMM in which the matrix is divided into rectangular blocks having a size that fits into the cache for storing, retrieving and operating on. Further, the combined teaching of references is clearly applicable for system having one dimensional L1 or L2 caches which has a first dimension being one that is clearly smaller than a corresponding first dimension of the data block, and a second dimension that must be greater than the corresponding second

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dimension of the data block in order for the block to fit into the cache. In other words, for one a dimensional cache, in order to fit into the cache, the data block would have a first dimension larger than a corresponding first dimension (the dimension of one) of the cache, and a second dimension smaller than the corresponding second dimension of the caches as claimed.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chuong D. Ngo whose telephone number is (571) 272-3731. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Chuong D Ngo
Primary Examiner
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05/14/2007